WHAT IS CLAIMED IS:

1. A winding of an electric machine comprising:

at least one series of serially connected AC bars, each AC bar comprising:

a series of serially connected turns formed by litz wire having a plurality of strands; and

at least one cooling tube, wherein individual strands of the plurality of strands are respectively positioned substantially adjacent to the at least one cooling tube at at least one transfer point for providing heat transfer from the respective individual strands to the at least one cooling tube.

2. The winding of Claim 1, wherein heat is further transferred along the respective individual strands along the direction of a longitudinal axis of the respective individual strands.

3. The winding of Claim 1, wherein a surface area of individual turns of the series of turns is positioned substantially adjacent to a respective surface area of the at least one cooling tube for establishing respective heat transfer areas, wherein each respective heat transfer area includes a plurality of transfer points.

4. The winding of Claim 3, wherein each turn is positioned for establishing a respective heat transfer area.

5. The winding of Claim 1, wherein the at least one cooling tube is formed of stainless steel.

6. The winding of Claim 1, wherein the series of turns includes a first and second group of turns, wherein the first group of turns is substantially symmetrically arranged with respect to the second group of turns.

7. The winding of Claim 6, wherein the first and second groups of turns are symmetrically arranged around the at least one cooling tube.

8. The winding of Claim 3, wherein the at least one cooling tube has first and second opposing surfaces, and wherein heat transfer areas are established along the first and second opposing surfaces.

9. The winding of Claim 1, wherein the series of turns is insulated with a thermally activated adhesive.

10. The winding of Claim 1, wherein the series of turns is formed by winding the litz wire into a coil including the series of turns, insulating the coil with a thermally activated adhesive, shaping the coil into a predetermined shape, all at ambient temperature, and then heating the coil for curing the adhesive.

11. The winding of Claim 1, wherein the series of turns is formed by winding the litz wire into a coil including the series of turns, shaping the coil into a predetermined shape, and epoxy impregnating the coil.

12. An electric machine having an AC winding comprising:

at least one series of serially connected AC bars, each AC bar comprising:

a series of serially connected turns formed by litz wire having a plurality of strands; and

at least one cooling tube, wherein individual strands of the plurality of strands are respectively positioned substantially adjacent to the at least one cooling tube at at least one transfer point for providing heat transfer from the respective individual strands to the at least one cooling tube.

13. A winding of an electric machine comprising:

at least one series of serially connected AC bars, each AC bar comprising:

a series of serially connected turns including at least one conductor;

at least one cooling tube having a cooling medium flowing through a conduit having a thermally conductive surface; and

a phase to ground insulation for providing electrical phase to ground insulation for the AC bar, wherein the phase to ground insulation surrounds the series of serially connected turns and the at least one cooling tube;

wherein respective turns of the series of turns contact the at least one cooling tube for transferring heat from the respective turns to the at least one cooling tube, wherein at each point of contact the phase to ground insulation does not intervene between the conductive surface of the at least one cooling tube and a respective conductor of the at least one conductor.

14. The winding of Claim 13, wherein the at least one cooling tube has a floating voltage potential.

15. The winding of Claim 14, wherein the floating voltage potential is within the range of a turn-to-turn voltage of the series of turns.

16. The winding of Claim 13, wherein the at least one cooling tube is electrically insulated with a film insulation of thickness not substantially greater than a minimum thickness for withstanding a maximum voltage difference between turns of the series of turns that contact the at least one cooling tube.

17. The winding of Claim 13, wherein the at least one cooling tube is coated with a thermally activated adhesive.

18. The winding of Claim 13, wherein at each point of contact a maximum amount of insulation intervening between the conductive surface and the at least one conductor includes at least one film insulator having a collective thickness substantially smaller than a thickness of the phase to ground insulation.

19. The winding of Claim 13, wherein each turn included in the AC bar contacts the at least one cooling tube for transferring heat from the respective turn to the at least one cooling tube.

20. The winding of Claim 13, wherein the at least one cooling tube has first and second opposing surfaces, and wherein turns of the series of turns contact the at least one cooling tube along the first and second opposing surfaces.

21. A method of manufacturing an AC winding of an electric machine comprising the steps of:

winding a litz wire into a coil having a series of turns at ambient temperature;

insulating the coil with a thermally activated adhesive at ambient temperature;

shaping the coil into a predetermined shape at ambient temperature; and

heating the coil for curing the adhesive.

22. The method of Claim 21, further comprising the step of positioning the coil for a surface area of individual turns of the series of turns to be positioned substantially adjacent to a respective surface area of at least one cooling tube for establishing respective heat transfer areas for transferring heat from the respective turns to the at least one cooling tube.

23. A method of manufacturing an AC winding of an electric machine comprising the steps of:

winding a litz wire into a coil having a series of turns;

shaping the coil into a predetermined shape; and

epoxy impregnating the coil.

24. The method of Claim 23, further comprising the step of positioning the coil for a surface area of individual turns of the series of turns to be positioned substantially adjacent to a respective surface area of at least one cooling tube for establishing respective heat transfer areas for transferring heat from the respective turns to the at least one cooling tube.